

ABSTRACT

An improved structure of a hydraulic control valve is provided which may be employed in a fuel injector for an automotive engine. The hydraulic control valve includes a piezoelectric actuator and a hydraulic valve mechanism. The hydraulic valve mechanism works to convert a mechanical deformation of the piezoelectric actuator produced as a result of application of a voltage into a hydraulic pressure to move a valve member hydraulically for opening and closing a fluid port selectively. The hydraulic valve mechanism is so designed that the piezoelectric actuator produces a maximum output force which works to develop the hydraulic pressure when opening the fluid port through the valve member and decreases after the fluid port is opened and which is set smaller than one-half of a maximum possible output force of the piezoelectric actuator under application of a maximum working voltage to said piezoelectric actuator, thereby ensuring a maximum movement of the valve member at high energy efficiency under application of the voltage within a working voltage range.